

Spotted Seal Haulout Surveys

Colville River Delta - 2014

January 2015

SAExploration, Inc.
8240 Sandlewood Place, Suite #102
Anchorage, Alaska 99507



Owl Ridge Natural Resource Consultants, Inc.
6407 Brayton Drive, Suite 204
Anchorage, Alaska 99507
T: 907.344.3448
F: 907.344.3445
www.owlridgenrc.com



- Page Intentionally Left Blank -

TABLE OF CONTENTS

1. INTRODUCTION..... 1

2. SPOTTED SEAL ECOLOGY 1

3. SURVEY APPROACH 1

4. SURVEY RESULTS 2

5. DISCUSSION..... 5

6. REFERENCES..... 6

List of Tables

Table 1. Locations and conditions of identified spotted seal haulout sites..... 3

List of Figures

Figure 1. Spotted seal haulout sites and observations. 4

- Page Intentionally Left Blank -

1. INTRODUCTION

SAExploration, Inc., (SAE) conducted a three-dimensional (3D) ocean bottom node (OBN) seismic survey during the 2014 open-water period (September 6-25) within a 300-square-mile area east of the Colville River Delta. Because of the proximity of seismic survey area to haulout sites are used by spotted seals, the North Slope Borough (NSB) requested, during a peer review of the project marine mammal monitoring and mitigation plan (4MP), that SAE identify and monitor haulout site use relative to the planned seismic activities. Very little is currently known about spotted seal activity in the Delta or how underwater noise generated by seismic airguns might disturb or alter haulout activity. This document reports the results of the spotted seal monitoring program.

2. SPOTTED SEAL ECOLOGY

Spotted seals (*Phoca largha*) are found in the Chukchi and Beaufort seas in summer and the Bering Sea year-round. During the summer months they haul out on shore along arctic waters, while in the winter, they haul out on ice floes along the edge of the pack ice (Rugh *et al.* 1993, Lowry *et al.* 1998). They range from the coast of Alaska, to the Sea of Japan and the Sea of Okhotsk (Allen and Angliss 2014). Seals inhabiting Alaskan waters belong to the Bering Distinct Population Segment (DPS), which includes breeding groups found in the Beaufort, Chukchi, and East Siberian seas (Boveng *et al.* 2009). Ver Hoef *et al.* (2014) recently estimated the Bering Sea wintering population at 233,700 animals.

Spotted seals are migratory and extremely mobile. Spotted seals commonly are found in bays, estuaries, and the mouths of rivers during the summer months where they breed and molt (Frost *et al.* 1993). They mostly make long trips to sea combined with somewhat short visits to haulout sites on shore, or congregate in areas to exploit anadromous fish runs (Boveng 2009). Terrestrial haulout sites are located on sand, mud, or gravel beaches, or on rocks close to shore (Heptner *et al.* 1976, Lowry 1984, Quakenbush 1988).

The Beaufort Sea represents peripheral summer range for this species. Historically, 400 to 600 seals annually inhabited the Colville and Sagavanirktok river deltas, but recently only about 20 seals have been observed any one site (Johnson *et al.* 1999). Spotted seals in the Colville River Delta are likely associated with summer whitefish and/or salmon spawning runs, which suggests an ecological affinity to the river system more than to the ocean (Bureau of Ocean Energy Management 2014), although they are regularly observed in marine waters a few kilometers offshore (Green and Negri 2005, 2006; Green *et al.* 2007).

In 2010, the National Marine Fisheries Service (NMFS) determined that listing the Bering DPS as threatened or endangered under the Endangered Species Act was not warranted. However, spotted seals remain protected under the Marine Mammal Protection Act, and are a local subsistence resource.

3. SURVEY APPROACH

In November 2013, SAE submitted an Incidental Harassment Authorization (IHA) application to NMFS Office of Protected Resources requesting take for marine mammals that might be acoustically harassed by

the underwater noise associated with seismic airgun operation. Included with the application was a 4MP describing how SAE intended to monitor local marine mammal populations and mitigate potential effects of seismic noise to these populations. During a March 2014 peer review of the 4MP, the NSB requested that SAE conduct before, during, and after aerial surveys of the spotted seal haulout sites, an additional monitoring task that was subsequently included in a revised 4MP. However, during the public review of the IHA application, which included the revised 4MP, the village of Nuiqsut objected to the aerial surveys citing that the additional flights would only add to an already high amount of air traffic and possibly exacerbate effects on subsistence resources, (especially since another party was also planning on conducting aerial monitoring of Colville River Delta seal haulout sites). Further, when SAE met with the village hunters as part of the project Plan of Cooperation with North Slope villages, the hunters expressed concern for survey and monitoring success given their understanding that most haulout use during the period when the seismic surveys were planned (early fall) is largely limited to riverine haulout sites (where the salmon runs occur), rather than at marine haulout sites. Finally, SAE's client decided on a seismic shoot area located 7 to 25 kilometers east of the Colville River Delta. After discussing these points with NMFS, SAE agreed to conduct a spotted seal monitoring program, less as a way to assess impacts and more as a means to gather general haulout use, and modified to a boat-based survey with the number of survey days limited to four. The specific project methods as designed were:

- Conduct four surveys: one before (late August), two during (September), and one after (early October) the seismic survey period.
- Conduct surveys from boat captained by a local Nuiqsut hunter.
- Travel to all known haulout sites within both riverine and marine waters within the Colville River Delta.
- Planned survey routes including survey of the main eastern river channel, the outer marine shoreline of the delta, and returning via the main eastern river channel.
- Mark all locations of all known haulout sites and all observations of spotted seals.

4. SURVEY RESULTS

As mentioned in Section 3, four haulout site surveys were planned: one pre-seismic survey in August, two during-seismic surveys in September, and one post-seismic survey in October. However, the seismic operations, which began on September 6, were completed on September 25, one week earlier than anticipated. Consequently, the September 26 seal survey, conducted as scheduled, occurred a day after the seismic surveys were completed, and not simultaneous to seismic activities as originally planned. A second post-seismic was not conducted largely due to deteriorating weather conditions, but also because the post-seismic survey goal was met.

Specific details of each survey follow.

August 31: This pre-seismic survey was conducted by Mr. Jonah Leavitt, a subsistence advisor/marine mammal observer with Owl Ridge, and Mr. Sammy Kunaknana, a Nuiqsut boat-operator and seal hunter. They surveyed the main eastern channel (Colville or Kuukpik Channel) from south of Nuiqsut to near the

mouth of the Colville River. The ocean was not accessed due to high winds and waves (which were also washing over any potential marine haulout site). The river was also running high after recent rains, and a number of the haulout sites identified by Mr. Kunaknana were partially or fully flooded. Five haulout sites were visited (see Table 1 and Figure 1 for locations of sites). Site 1 was flooded, but water levels were still very shallow and three spotted seals were hauled out there. Sites 2 and 3 were also flooded, but no seals were observed. Site 4 was not flooded, but was still empty of seals. Only a small fraction of Site 5 remained unflooded. No seals were observed initially at this site, but a single seal approached the haulout as the surveyors were leaving. Site 5 is located about 30 river kilometers upstream of Nuiqsut. Seven total seals were observed, four at or approaching riverine haulout sites, plus an additional three animals observed swimming in the river (Figure 1).

September 16: Mr. Leavitt and Mr. Kunaknana again surveyed the Nigliq Channel from Nuiqsut to the river mouth, and then both eastward and westward of the mouth in an attempt to access known haulout sites (approximately 100 kilometers of total survey effort). The river levels had dropped considerably and access to both riverine and marine haulout sites were very limited. The surveyors did approach to within about 1 kilometer of a known marine haulout site near the mouth of the Nigliq Channel (Site 8 in Figure 1), but no seals could be seen at the site. Three single seals were observed swimming in marine waters (Figure 1).

September 26: Mr. Leavitt with Mr. Vernon Long (also a boat operator and Nuiqsut hunter) began their survey down the Colville Channel but were turned back by low water exposing a blocking sandbar. The surveyors then returned to Nigliq Channel and surveyed it downstream to the ocean, and then eastward around the Delta to the mouth of the Colville Channel. However, wind, newly formed sea ice, and low water prevented them from accessing any of the known marine haulout sites or entering the Colville Channel. The surveyors returned back to Nuiqsut via the Nigliq Channel. No seals were observed at any point during approximately 140 kilometers of survey effort.

Returning back to Nuiqsut, Mr. Leavitt asked Mr. Long to identify on a map the location of the marine haulouts sites they had been trying to access. These are identified in Figure 1 as Sites 6 to 9.

Table 1. Locations and conditions of identified spotted seal haulout sites.

Site No.	Waypoint	Latitude	Longitude	No. of Seals	Condition
1	41	N 70°21.827'	W 150°40.745'	3	Flooded
2	42	N 70°22.669'	W 150°42.055'	0	Flooded
3	43	N 70°22.800'	W 150°35.074'	0	Flooded
4	45	N 70°05.458'	W 151°02.740'	0	Not Flooded
5	46	N 70°02.938'	W 151°09.565'	1	Mostly Flooded
6	N/A	N 70°29.811'	W 150°33.527'	N/A	N/A
7	N/A	N 70°27.368'	W 150°16.050'	N/A	N/A
8	N/A	N 70°24.070'	W 151°11.963'	0	N/A
9	N/A	N 70°27.796'	W 150°19.284'	N/A	N/A



Figure 1. Spotted seal haulout sites and observations.

5. DISCUSSION

The boat based surveys conducted August 31, September 16, and September 26 support historical accounts that small numbers of spotted seals occur within the Colville River Delta. A total of nine haulout sites were identified during the surveys or via communication with local hunters, but only four seals total were observed hauled out or near a haulout site, all at a single location (Site 1). An additional six seals were observed swimming. Shallow water, wind, and ice prevented ideal survey condition during the any of the survey attempts. Further, hauling out does not provide a thermoregulatory advantage if the air temperature is considerably colder than the water temperature. By late August, seasonally colder temperatures coupled with moderate to higher winds could have neutralized the advantage of hauling out.

Mr. Kunaknana attributed the paucity of seals observed to weather conditions and associated water levels. One week prior to the first August 31 survey, Mr. Kunaknana observed from 10 to 20 seals at several of the haulout sites (specific numbers and locations were not recorded). He felt that a heavy late August snow storm and high water levels accounted for the lack of seal observations during the August 31 survey, and low water levels, cold temperatures, and wind during the latter surveys.

SAE's September 2014 seismic program is unlikely to have affected haulout patterns of local spotted seal populations because:

1. The actual seismic survey effort occurred 7 to 25 km east of the Colville River Delta and nearest known seal haulout site. Sound source verifications conducted on the 620-in³ airguns used in the seismic survey showed that the radius to the 160 dB noise threshold was 1.818 km (Heath *et al.* 2014). By the distance to the nearest haulout site (7 km), the received sound pressure levels would have been well below 160 dB re 1 μ Pa (rms).
2. Much of the local seal population is found in riverine waters during September (following salmon runs) where they would have been acoustically shadowed from seismic noise.
3. Weather conditions appear to be the primary factor governing haulout behavior in September. Cold and windy weather conditions coupled with fluctuating water levels appeared to have reduced haulout behavior in the river independent of seismic activities.

The results of this study indicate that boats are not an effective platform for monitoring spotted seal haulout sites. The distance between sites, the shallow-water access to these sites, and general travel safety concerns during fall open-water conditions preclude effectiveness. An aerial platform, designed to avoid seal disturbance or conflicts with other subsistence use, should prove more effective and more efficient.

6. REFERENCES

- Bureau of Ocean Energy Management. 2014. SAExploration Inc. Colville River Delta 2014. 3D Geophysical Seismic Survey. Beaufort Sea, Alaska. Environmental Assessment. Office of Environment. Alaska OCS Region.
- Boveng, P.L., J.L. Bengtson, T.W. Buckley, M.F. Cameron, S.P. Dahle, B.P. Kelly, B.A. Megrey, J.E. Overland, and N.J. Williamson. 2009. Status review of the spotted seal (*Phoca largha*). U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-200, 153 p. Burns, J. J. 2002. Harbor seal and spotted seal, *Phoca vitulina* and *P. largha*. Pages 552-560 in W. F. Perrin, B. Würsig, and J. G. M. Thewissen, editors. Encyclopedia of Marine Mammals. Academic Press, San Diego, CA.
- Frost, K.J., L.F. Lowry, and G. Carroll. 1993. Beluga whale and spotted seal use of a coastal lagoon system in the northeastern Chukchi Sea. Arctic 46:8-16.
- Green, G.A., and S. Negri. 2005. Marine Mammal Monitoring Program: FEX Barging Project, 2005. Unpublished report prepared for ASRC Lynx Enterprises, Inc., Anchorage, Alaska, by Tetra Tech EC, Inc., Bothell, Wash.
- Green, G.A., and S. Negri. 2006. Marine Mammal Monitoring Program: FEX Barging Project, 2006. Unpublished report prepared for ASRC Lynx Enterprises, Inc., Anchorage, Alaska, by Tetra Tech EC, Inc., Bothell, Wash.
- Green, G.A., K. Hashagen, and D. Lee. 2007. Marine mammal monitoring program, FEX barging project, 2007. Report prepared by Tetra Tech EC, Inc., Bothell, WA, for FEX L.P., Anchorage, AK.
- Heath, B., K. Marks, and G. Jiménez. 2014. Sound Source Verification Final Report, Colville Delta Seismic Program. Seiche Measurements Ltd. Report to SAExploration, Inc. 29 pp.
- Heptner, L. V. G., K. K. Chapskii, V. A. Arsen'ev, and V. T. Sokolov. 1976. Common seal, *Phoca* (*Phoca*) *vitulina* Linnaeus, 1758. Pages 307-369 in L. V. G. Heptner, N. P. Naumov, and J. Mead, editors. Mammals of the Soviet Union. Volume II, Part 3--Pinnipeds and Toothed Whales, Pinnipedia and Odontoceti. Vysshaya Shkola Publishers, Moscow, Russia. (Translated from Russian by P. M. Rao, 1996, Science Publishers, Inc., Lebanon, NH).
- Johnson, C.B., B.E. Lawhead, J.R. Rose, M.D. Smith, A.A. Stickney, and A.M. Wildman. 1999. Wildlife studies on the Colville River Delta, Alaska, 1998. Rep. from ABR, Inc., Fairbanks, AK, for ARCO Alaska, Inc., Anchorage, AK.
- Lowry, L. F. 1984. The spotted seal (*Phoca largha*). In Alaska Dep. Fish Game Mar. Mammal Species Accounts. Vol. I, p. I-II. Juneau.
- Lowry, L.F., K.J. Frost, R. Davis, D.P. DeMaster, and R.S. Suydam. 1998. Movements and behavior of satellite-tagged spotted seals (*Phoca largha*) in the Bering and Chukchi Seas. Polar Biology 19:221-230.
- Quakenbush, L. T. 1988. Spotted seal: *Phoca largha*. Pages 107-124 in J. W. Lentfer, editor. Selected Marine Mammals of Alaska: Species Accounts with Research and Management Recommendations. Marine Mammal Commission, Washington, DC.

- Rugh, D.J., K.E. W. Sheldon, D.E. Withrow, H.W. Braham, and R.P. Angliss. 1993. Spotted seal (*Phoca largha*) distribution and abundance in Alaska, 1992. Annual report to the MMPA Assessment Program. Silver Spring, MD: NMFS, NOAA, Office of Protected Resources.
- Ver Hoef, J.M., M.F. Cameron, P.L. Boveng, J.M. London, and E.M. Moreland. 2014. A hierarchical model for abundance of three ice-associated seal species in the Eastern Bering Sea. *Statistical Methodology* 17:46-66.